



Procedures and Guidelines

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Title: HST Program Office Configuration Management Procedures (SCM-1020, Revision D)

P1. PURPOSE

These Procedures and Guidelines (PG) define the Configuration Management (CM) Procedures (CMP) for the Goddard Space Flight Center (GSFC) Hubble Space Telescope (HST) Program. This procedure was approved May 5, 2000 (internal number SCM-1020) and is designated as Revision D.

P2. REFERENCES

GPG 1410.1	Directives Management
GPG 1410.2	Configuration Management
400-PG-1410.2.1	Configuration Management
500-PG-8700.2.3	Issue and Management of GSFC Engineering Drawing Numbers
500-PG-8700.2.5	GSFC Engineering Drawing Standards
DOD-D-1000B	Drawings, Engineering, and Associated Lists
MIL-STD-100G	DOD Standard Practice for Engineering Drawings
MIL-STD-130K	Identification Marking of U.S. Military Property
MIL-STD-961D	DOD Standard Practice for Defense Specifications
MIL-STD-973	Configuration Management
NSTS 18468	Mission Integration Control Board Configuration Management Procedures
P-440-011	HST Documentation Style Guide
SCM-1023	HST Configuration Management Detailed Procedures Document
VEST MOU 441/442	VEST Memorandum of Understanding Between Code 441 and 442

P3. SCOPE

This document establishes the requirements of the HST Program CM system. It applies to Codes 440, 441, and 442. Directives on the GDMS are controlled within GDMS and are not subject to this procedure.

This procedure establishes the formal configuration management approach used by the HST Program. It provides the CM mechanisms for control, changes, and traceability of requirements, design, productivity, and operations. This CM Procedure meets the requirements of GPG 1410.2 Configuration Management and 400-PG-1410.2.1A Configuration Control. It describes how:

- Compliance of new flight systems with HST's as configuration will be maintained
- Baselines will be established and controlled
- Hardware and software designs will be documented and released

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- Changes to documents will be defined, processed, and released
- Contractor CM efforts are integrated into those of the HST Project CM
- Specifications are generated and controlled
- Configuration audits will be performed
- Interfaces are documented and controlled
- Configuration status accounting is accomplished
- The evolution of the design, software, hardware, and documentation is tracked and managed throughout the project

P4. DEFINITIONS

As specified in the attached procedure.

P5. AUTHORITIES AND RESPONSIBILITIES

As specified in the attached procedure.

P6. CANCELLATION

440-PG-8700.2.1 (SCM-1020 Revision C).

P7. QUALITY RECORDS

None

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During the development of this procedure, there have been several document number and name changes as iterated below:

DOCUMENT NUMBER: SCM-1020

DOCUMENT TITLE: HUBBLE SPACE TELESCOPE CONFIGURATION MANAGEMENT PLAN

AS OF May 5, 2000

SPECIFICATION ISSUE	CHANGE HISTORY	EFFECTIVITY
GSFC-ST-CMP June, 1981	Title – GSFC Space Telescope Project Configuration Management Plan	For GSFC Level III activities.
GSFC-ST-CMP Revision A May, 1985	Title – Space Telescope Project GSFC (STP-G) Configuration Management Plan	For GSFC Level III activities.
SCM-1020 Revision B August, 1990	Title – Hubble Space Telescope Project - GSFC (HSTP-G) Configuration Management Plan	For GSFC Level III activities.
SCM-1020 Revision C May 6, 1996	Title – Hubble Space Telescope Flight Projects Configuration Management Plan	For GSFC Level II activities. HST CCR 3357 Level 2 CCB Minutes #477. Document placed under CCB control.
SCM-1020 Revision D May 5, 2000	Title – Hubble Space Telescope Program Office Configuration Management Procedures	For GSFC Level II activities. Applicable to Program Office, Development Project and Operations Project. ISO GDMS Number 440-PG-1410.2.1. HST CCR 4747 Level 2 CCB Minutes #541

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CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT
<http://gdms.gsfc.nasa.gov/gdms> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

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ACRONYMS AND ABBREVIATIONS

ACS	Advanced Camera for Surveys
AURA	Association of Universities for Research in Astronomy
BATC	Ball Aerospace and Technologies Corporation
C&DH	Control and Data Handling
CAL	Configured Articles Lists
CCB	Configuration Control Board
CCR	Configuration Change Request
CCS	Control Center System
CDR	Critical Design Review
CEI	Contract End Item
CHG	Change
CI	Configuration Item
CM	Configuration Management
CMO	Configuration Management Officer/Office
CR	Change Request
CSCI	Computer Software Configuration Item
DASDF	DF-224 Analysis and Software Development Facility
DCF	Science Data Capture Facility
DF	Development Facility
DM	Data Management
DOD	Department of Defense
DR	Discrepancy Report
DRD	Data Requirements Document
ECP	Engineering Change Proposal
EDB	Engineering Data Base
ESA	European Space Agency
ESERP	EVA Servicing Equipment Review Panel
ESTIF	Extended Software Test and Integration Facility
EVA	Extra Vehicular Activity
FCA	Functional Configuration Audit
FGS	Fine Guidance System

FSS Flight Support System

GSE Ground Support Equipment

GSFC Goddard Space Flight Center

GSP Government-Specified Purchases

HST Hubble Space Telescope

HSTOMS HST Observatory Management System

ICD Interface Control Document

IRD Interface Requirements Document

JPL Jet Propulsion Laboratory

JSC Johnson Space Center

KSC Kennedy Space Center

LMMS Lockheed Martin Missiles and Space Company

MASIS Monitor and Science Instrument Simulator

MICB Mission Integration Control Board

MIL Military

MOU Memorandum of Understanding

MOSES Mission Operations Systems Engineering and Software

MULE Multiuse Lightweight Equipment Carrier

NASA National Aeronautics and Space Administration

NSSC-1 NASA Standard Spacecraft Computer-1

NTS National Space Transportation System

OPE ORU Protective Enclosure

ORI Orbital Replacement Instrument

ORU Orbital Replacement Unit

ORUC Orbital Replacement Unit Carrier

OTA Optical Telescope Assembly

PCA Physical Configuration Audit

PDB Project Data Base

PDR Preliminary Design Review

PDT Project Development Team

PIRN Preliminary Interface Revision Notice

POP Project Operating Plan

PRD Project Reference Data

PRS Preliminary Operations Requirements Test Support Refurbishment System

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PSCN Preliminary Specification Change Notice

RAC Rigid Array Carrier

ROM Rough Order of Magnitude

SA Solar Array

SAC Second Axial Carrier

SAM Systems Assurance Manager

ScI Science Institute

SDD Software Design Document

SI Scientific Instrument

SIPE Science Instrument Protective Enclosure

SITS Science Instrument Test System

SOW Statement of Work

SRD Software Requirements Document

SSM Support Systems Module

ST Space Telescope

STD Standard

STS Space Transportation System

TMIS Technical Management and Information System

TO Technical Officer

VAP Verification and Acceptance Program

VEST Vehicle Electrical Systems Test

WFC3 Wide Field Camera 3

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1. CONFIGURATION MANAGEMENT

1.1 INTRODUCTION

Configuration Management (CM) as defined for the Hubble Space Telescope (HST) Program is the systematic identification and control of baseline documentation and evaluation of subsequent changes to the baseline of HST-developed software, hardware, and systems. CM provides formal control, identification, status accounting and verification of all configuration items (CIs). An alternate designation, "Contract End Item" (CEI) has received traditional usage, but this document designates "Configuration Item" since all CIs are not necessarily line items of a contract.

This CM Procedure describes a system for applying technical and administrative direction and surveillance to:

- Identify and document the functional, allocated, and physical characteristics of the hardware, software, integration and test procedures, and operations procedures required by the HST Program
- Control changes to these characteristics and identify change impacts
- Record and report change processing and implementation status
- Verify through audits and reviews that the proper configuration is maintained and implemented
- Coordinate change processing among the various contractor, associate, and government Configuration Control Board (CCBs)

The detailed procedures for the processes, forms and reports identified in this CM Procedure are described in the Hubble Space Telescope Configuration Management Detailed Procedures Document (SCM-1023).

1.2 DIRECTIVES AND POLICIES

The documents referenced throughout this CM Procedure and listed in Paragraph P2 will be used for implementing the CM requirements. Detailed procedures will be maintained, released, and included in SCM-1023 HST Project CM Detailed Procedures. New or revised policies, procedures, and directives that are material to this program will be implemented as necessary.

2. HST PROGRAM OFFICE ORGANIZATION

The HST Program Office is under the direction of the Associate Director/Program Manager for HST/Code 440. It is comprised of Code 441 HST Operations Project, Code 442 HST Development Project, Code 443 Next Generation Space Telescope Project, and Code 444 Space Science Mission Operations Project. The HST Program Office organization is shown in Figure 2-1.

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This document serves as the HST Project configuration management procedures and is applicable to the HST portions of the program office responsibility. The term HST Project as used in this document refers to the HST Program Office/Code 440, the HST Operations Project/Code 441, and the HST Development Project/Code 442.

Separate CM Procedures documents will be developed by the NGST Project/Code 443 and the Space Science Mission Operations Project/Code 444.

2.1 HST PROJECT CONFIGURATION CONTROL BOARD (CCB) ORGANIZATION STRUCTURE

The HST Project organization utilizes five CCB levels. Level one through four are shown in Figure 2-2 and 2-3. Each CCB has been delegated authority for particular documents, milestones, configuration items (CIs), or monetary limits within the scope of that level. The CCB will assign a disposition to change requests within the authority of that CCB level. The CCB will review and comment on change requests initiated at higher levels. The highest level CCB which has authority in a particular area designates the final disposition of a change request.

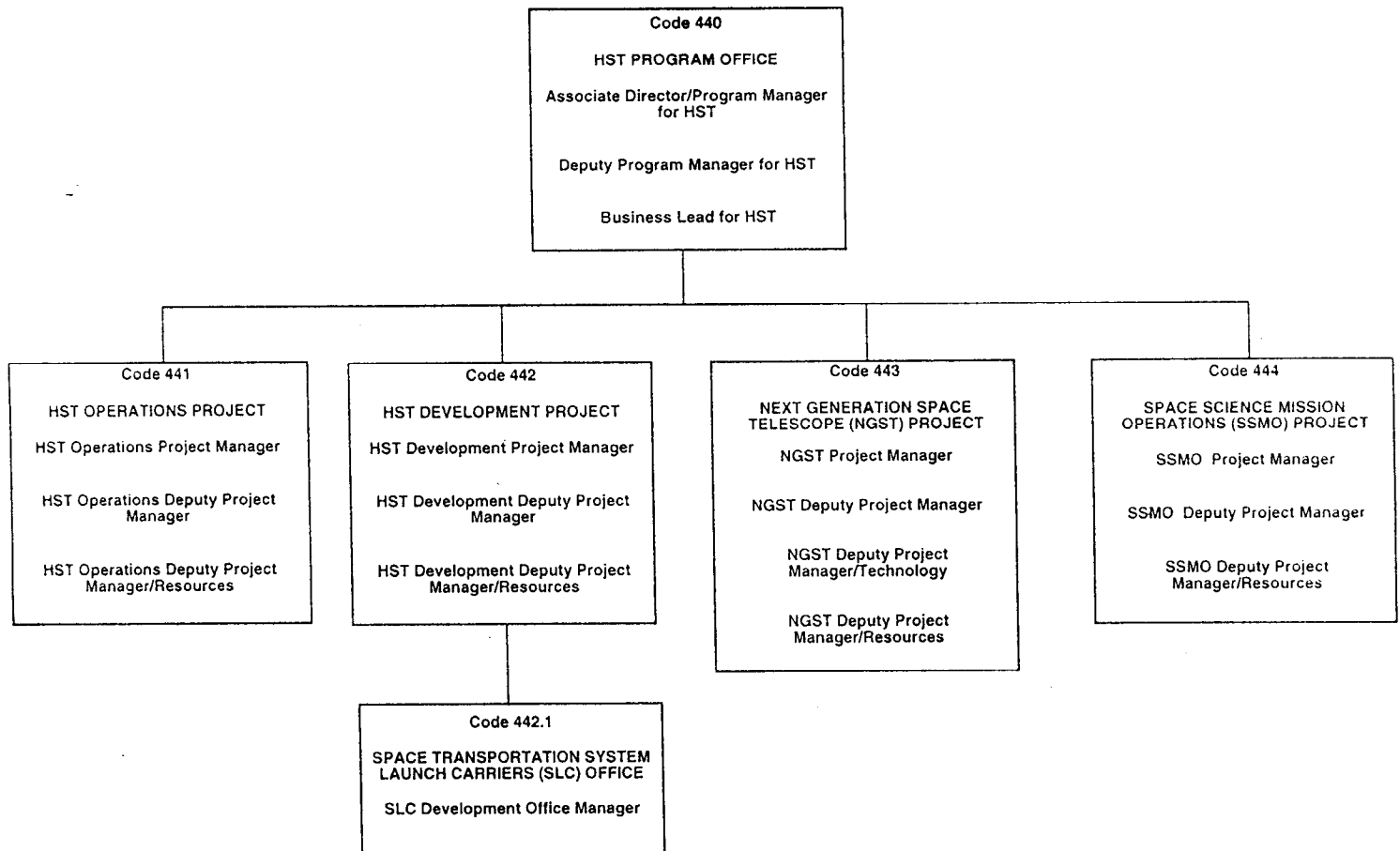


Figure 2-1. HST Program Organization Chart

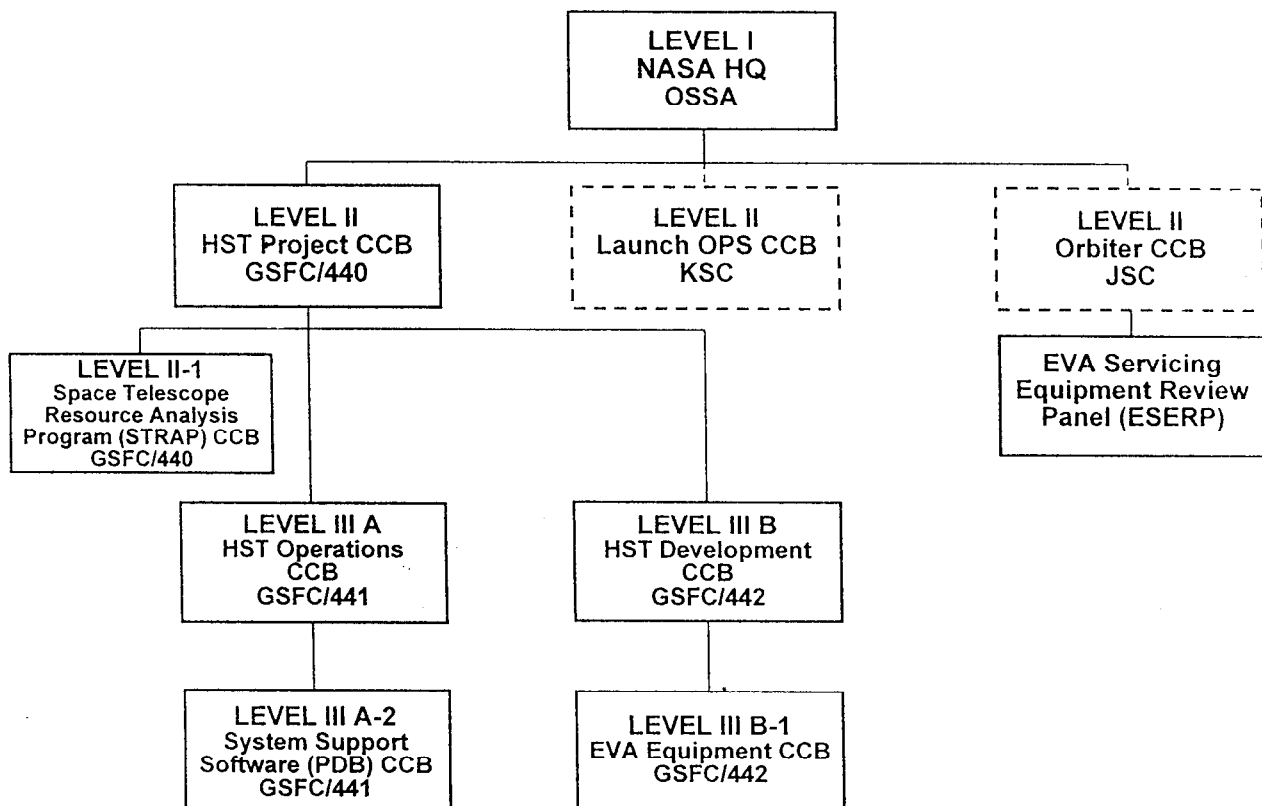


Figure 2-2. HST Project CCB Organization

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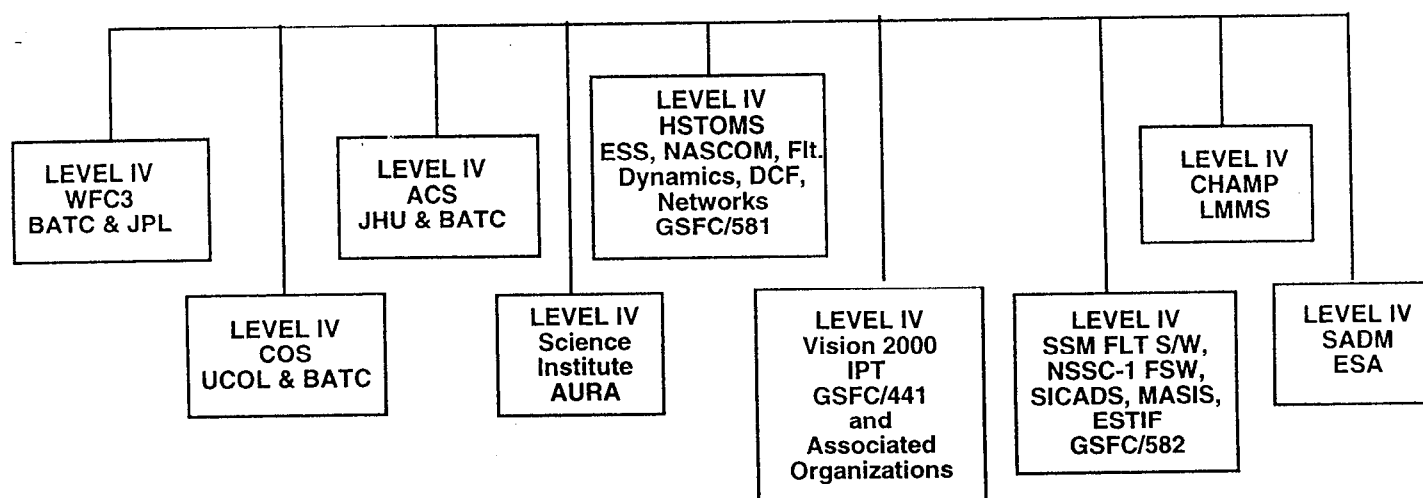


Figure 2-3. HST Level IV Contractor/Associate CCBs

2.1.1 Level I CCB Organization

National Aeronautics and Space Administration (NASA) Headquarters Office of Space Sciences has been delegated Level I CCB authority applicable to Level I schedule milestones, Hubble Space Telescope (HST) requirements, project/mission objectives, and servicing mission objectives.

2.1.2 Level II CCB Organization

The HST Program Office at the Goddard Space Flight Center (GSFC)/Code 440, Johnson Space Center (JSC), and Kennedy Space Center (KSC) have been delegated Level II CCB authority applicable to their areas of HST responsibility. The GSFC/Code 440 is responsible for HST program management. The JSC is responsible for HST Orbiter servicing operations. The KSC is responsible for HST servicing launch operations. See Figure 2-2 for Level II CCBs.

2.1.3 Level III CCB Organization

The HST Program Office has delegated Level III CCB authority to the HST Operations Project/GSFC/Code 441 and the HST Development Project/GSFC/Code 442. Details of these Level III CCBs can be found in Section 2.3 and 2.4. See Figure 2-2 for Level III CCBs.

2.1.4 Level IV CCB Organization

Individual contractors/organizations have been delegated Level IV authority. This level of authority is applicable to a particular CI or system to be developed or supplied to the HST Project. See Figure 2-3 for Level IV CCBs. Certain configuration items have been delegated to Level IV Product Development Teams (PDTs) which are composed of government and contractor personnel.

2.1.5 Level V CCB Organization

Individual organizations or subcontractors have been delegated Level V authority if necessary. This level of authority is applicable to a particular CI, system, or service to be supplied to a Level IV organization.

2.2 HST PROJECT LEVEL II CCB

The Associate Director/Program Manager for HST is responsible for establishing the Level II CCB and appointing members to the board. The board members are detailed in Section 2.2.2. The Associate Director or designee serves as chairperson. The CCB shall meet at the direction of the chairperson.

This board is responsible for the disposition of all configuration change requests (CCRs) generated by HST Project staff members or Level IV organizations requiring Level II action.

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Level II disposition pertains to CCRs affecting documents base-lined by Level II, CCRs to baseline a new document or cancel a document at Level II, CCRs affecting other Level II CCBs, and CCRs affecting both the HST Operations Project and the HST Development Project. The board will forward CCRs to Level I or other Level II CCBs after disposition if the changes are outside the scope of its authority. The board will recommend a disposition for any change received from other Level II CCBs.

2.2.1 Level II CCB Chairperson Responsibilities

The chairperson has the following responsibilities:

- Convenes CCB meetings on a regular basis
- Approves or disapproves all CCRs within the scope of the Level II authority
- Concurs with requests for withdrawal of CCRs
- Assigns a disposition and approves comments to any CCR received from another Level II board
- Ensures that each CCR receives an adequate review from the CCB members
- Reviews all CCB member recommendations and comments
- Assigns actions and assignees to implement approved changes
- Authorizes the CCB minutes
- Ensures that the CCRs receive a higher or lower level board review, as required, and that coordination has been accomplished between the Level IIIA and Level IIIB CCBs

2.2.2 Level II CCB Member Responsibilities

The Level II CCB is composed of representatives of both the HST Development Project and the HST Operations Project and of each project discipline. CCB members are responsible for reviewing all proposed changes and for determining the potential impact on their disciplines. The CCB members and responsibilities of the CCB members are as follows:

- Deputy Program Manager/Technical – Responsible for reviewing all CCRs for overall technical impact to the HST Project. The Deputy Program Manager/Technical may be designated to serve as CCB chairperson.
- Systems Assurance Manager (SAM) - Responsible for re-viewing all matters relating to Systems Assurance for Code 300 and will review and verify the CIs at each milestone designated by the HST Project Associate Director. The SAM will ensure that any CI change resulting in a hardware change will be verified at the hardware level.
- Operations Project Manager - Responsible for reviewing all changes pertaining to the HST Operations Project which includes HST operations, ground systems development, science management, operational systems development, support systems development, observatory systems, and servicing mission operations.
- Development Project Manager - Responsible for reviewing all changes pertaining to the HST Development Project which includes instrument development, observatory development, servicing hardware development, and servicing mission development.

- Senior Scientist - Responsible for reviewing all changes pertaining to the scientific aspects of each selected Science Instrument (SI) and Orbital Replacement Instrument (ORI) developed for HST to ensure that the scientific objectives are met.
- Systems Management Manager – Responsible for reviewing all changes for impact on overall HST flight and ground systems
- Procurement Manager - Responsible for reviewing all changes for impact on HST contracts.
- Ad-hoc CCB members may consist of disciplines associated with ground systems, mission operations, instruments, spacecraft, or science. They are selected based on relevance of their expertise in CCB actions.

2.2.3 Configuration Management Officer Responsibilities

The Configuration Management Officer (CMO) duties include management of the CM Office, implementing CM and Data Management (DM) procedures, and serving as secretary of the Level II and III Project CCBs. In addition, the CMO is responsible for project configuration identification, configuration control, configuration status accounting, interface control, and configuration audits.

The CMO is responsible for ensuring an effective, controlled flow of data through the CCB. The CMO shall perform the following duties:

- Serve as the central point of contact for processing configuration changes.
- Review CCRs to ensure compliance with project CM requirements.
- Serve as recording secretary of the CCB.
- Maintain the CM status accounting system.
- Record minutes of the CCB meetings and distribute copies to attendees.
- Track CCB action items.
- Schedule CCB meetings with the concurrence of the CCB chairperson by publishing notification memoranda (i.e., setting date, time, place, and agenda), and providing review packages to the CCB chairpersons.
- Coordinate changes to baselined documentation with appropriate internal and external organizations.
- Coordinate the review of the Configured Articles List (CAL) with representatives of the appropriate functional organizations to verify the list. This will be done as described in Section 5.3 of this document.
- Perform periodic formal and informal audits of the functional organizations and contractors' CM systems.

2.2.4 CCR Sponsor Responsibilities

A sponsor will be assigned to each CCR upon initiation. The CCR sponsor may be a member of the HST Program Office/Code 440, a member of the HST Operations Project/Code 441, or a member of the HST Development Project/Code 442. Sponsors will be assigned according to the

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following criteria:

- A change affecting the scope of a Level IV contract or Memorandum of Understanding (MOU) will be sponsored by the technical officer (TO) or equivalent for that contract or MOU.
- A change affecting a Level III or II baselined document or software system will be sponsored by the staff member assigned as monitor for that document or system.
- A change affecting other systems, software, or documents not included above will be assigned to the staff member whose area of responsibility is most affected by the change.

The sponsor's name will appear on the CCR form. All CCR inputs which reflect disapproval or comments will be forwarded to the sponsor by the CMO as received. The sponsor will coordinate and assess these inputs and determine their validity or merit. The CMO will notify the sponsor when the CCR is ready to be scheduled for the CCB. A consolidated recommendation is then forwarded to the CMO by the sponsor prior to the CCB meeting for that CCR. The sponsor will attend the CCB meeting to present the CCR and the CCB recommendation for disposition.

The sponsor will assess the JSC or KSC Level II or NASA Headquarters Level I disposition; for those changes requiring these approvals, to ascertain the impact if these dispositions conflict with the HST Project disposition.

2.3 HST OPERATIONS PROJECT LEVEL IIIA CCB ORGANIZATION

The HST Operations Project Manager is responsible for establishing the Level IIIA CCB and appointing members to the board. The board members are detailed in Section 2.3.2. The Project Manager or designee serves as chairperson. The CCB shall meet at the direction of the chairperson. The chairperson of this board also serves on the Level II CCB.

This board is responsible for the disposition of all CCRs requiring Level IIIA action. Level IIIA disposition pertains to CCRs affecting documents baselined by Level IIIA, CCRs to baseline or cancel a document at Level IIIA, and CCRs affecting CIs under Level IIIA control.

The board will approve and forward to Level II those CCRs which are outside the scope of its authority. The board will review, determine impacts, and recommend a disposition for all Level II CCRs prior to the Level II disposition.

2.3.1 Level IIIA CCB Chairperson Responsibilities

The Level IIIA chairperson has the following responsibilities:

- Convene CCB meetings on a regular basis
- Approve or disapprove all CCRs within the scope of the Level IIIA authority
- Concur with requests for withdrawal of CCRs

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- Assign a Level IIIA disposition and approve comments to CCRs requiring Level II disposition
- Ensure that each CCR receives an adequate review from the CCB members
- Review all CCB member recommendations and comments
- Assign actions and assignees to implement approved changes
- Ensure that the CCRs receive a higher or lower level board review as required
- Serve as a member of the Level II CCB

2.3.2 Level IIIA CCB Member Responsibilities

The Level IIIA CCB is composed of representatives of the HST Operations Project disciplines. CCB members are responsible for reviewing all proposed changes and for determining the potential impact on their disciplines. The CCB members and responsibilities of the CCB members are as follows:

- Deputy Project Manager for Operations - Assists the project manager in reviewing all CCRs for impact to the Operations Project. The Deputy Project Manager may be designated to serve as CCB chairperson.
- Deputy Project Manager for Resources - Reviews all CCRs for impact to the HST Operations Project cost, resources, procurement, and schedules.
- Systems Management Manager - Reviews all CCRs for overall system impacts on STOCC operations systems and procedures, ground system hardware and software, flight software and related test facilities, PDB, and the CHAMP contractor.
- Science Operations Manager - Reviews all CCRs for impacts on science programs and the Sci systems.
- Operations Manager - Reviews all CCRs for impacts on HST operations, observatory operations, and observatory systems.
- Systems Assurance Manager - Reviews all CCRs for impact on all matters relating to the quality of the HST Operations Project systems and configuration items.
- Flight Software/Support Systems Manager - Reviews all CCRs for impact to support systems development, specifically, SSM flight computer software, NASA Standard Spacecraft Computer 1 (NSSC-1) flight software, flight software test facilities, flight software integration, and SI software.
- Operations Servicing Mission Manager - Reviews all CCRs for impacts to servicing mission operational activities and the integration of new hardware into the operational environment.
- Operations Project Scientist - Reviews all CCRs for impact to the on-board science instruments, ORIs, and other scientific aspects of the HST Operations Project.
- Financial Manager - Reviews all CCRs for impact to the HST Operations Project budget and cost
- Procurement Representative - Reviews all CCRs for impact to HST Operations Project contracts.
- HSTOMS Manager (Code 581) - Reviews all CCRs for impact to the HST observatory management system, STOCC, test and verification, and coordinates impacts with other Code

- 500 organizations.
- Ground Systems Manager – Reviews all CCRs for impact to HST ground systems including archive data, STOCC systems, HST network, and Science Institute communication interfaces.
- Vision 2000 Manager – Reviews all CCRs for impact to the Vision 2000 Control Center System.
- CHAMP Technical Manager – Reviews all CCRs for impact to the CHAMP contract.
- The ad-hoc CCB members may consist of disciplines associated with ground systems, mission operations, operations data, and science.

2.4 HST DEVELOPMENT PROJECT LEVEL IIIB CCB ORGANIZATION

The HST Development Project Manager is responsible for establishing the Level IIIB CCB and appointing members to the board. The board members are detailed in Section 2.4.2.

The Project Manager or designee serves as chairperson. The responsibilities of the chairperson are defined in Section 2.4.1. The CCB shall meet at the direction of the chairperson. The chairperson of this board also serves on the Level II CCB.

This board is responsible for the disposition of all CCRs requiring Level IIIB action. Level IIIB disposition pertains to CCRs affecting documents baselined by Level IIIB, CCRs to base-line or cancel a document at Level IIIB, and CCRs affecting CIs under Level IIIB control.

The board will approve and forward to Level II those CCRs which are outside the scope of its authority. The board will review, determine impacts, and recommend a disposition for all Level II CCRs prior to the Level II disposition.

2.4.1 Level IIIB CCB Chairperson Responsibilities

The Level IIIB chairperson has the following responsibilities:

- Convene CCB meetings on a regular basis
- Approve or disapprove all CCRs within the scope of the Level IIIB authority
- Concur with requests for withdrawal of CCRs
- Assign a Level IIIB disposition and approve comments to CCRs requiring Level II disposition
- Ensure that each CCR receives an adequate review from the CCB members
- Review all CCB member recommendations and comments
- Assign actions and assignees to implement approved changes
- Authorize the CCB minutes
- Ensure that the CCRs receive a higher or lower level board review as required
- Serve as a member of the Level II CCB

2.4.2 Level IIIB CCB Member Responsibilities

The Level IIIB CCB is composed of representatives of the HST Development Project disciplines. CCB members are responsible for reviewing all proposed changes and for determining the potential impact on their disciplines. The CCB members and responsibilities of the CCB members are as follows:

- Deputy Project Manager for Development - Assists the project manager in reviewing all CCRs for impact to the HST Development Project. The Deputy Project Manager may be designated to serve as CCB chairperson.
- Deputy Project Manager for Resources - Reviews all CCRs for impact to the HST Development Project cost, re-resources, procurement, and schedules.
- Servicing Mission Manager - Reviews all CCRs for impacts to Space Transportation System (STS) interfaces, servicing mission requirements, planning, and operations planning.
- System Assurance Manager - Reviews all CCRs for impacts on all matters relating to the quality of the flight systems under development.
- Instrument Development Manager - Reviews all CCRs for impact to ORIs.
- Observatory development Manager - Reviews all CCRs for impact to ORU hardware and support systems and integrated test systems.
- Systems Engineering Manager - Reviews all CCRs for impacts to overall flight systems to ensure that replacement observatory hardware designs are compatible with existing observatory interface and performance requirements.
- CHAMP CoTechnical Representative – Reviews all CCRs for impact to the CHAMP contract.
- Carriers Development Manager - Reviews all CCRs for impacts to carriers development including those resulting from ORU Protective Enclosure (OPE) development, Crew Aids and Tools (CATS) development, KSC operations, JSC operations, and EVA operations.
- EVA and Crew Systems Development Manager - Reviews all CCRs for impact to EVA and crew systems development including EVA operations, crew training, EVA tool development and interface to the JSC EVA Servicing Equipment Review Panel (ESERP).
- Development Project Scientist - Reviews all CCRs for impact to the orbital replacement SIs and FGS.
- Supervisory Resources Analyst for HST Development - Reviews all CCRs for impact to the HST Development Project budget and cost.
- Procurement Representative - Reviews all CCRs for impact to HST Development Project contracts.
- Ad-Hoc members - The ad-hoc CCB members may consist of disciplines associated with spacecraft systems engineers, integration and test engineers, test facilities managers, etc.

2.5 HST OPERATIONS PROJECT LEVEL IIIA-2 CCB ORGANIZATION

The HST Operations Project Level IIIA-2 System Support Software CCB is composed of representatives of all areas affected by System Support Software [i.e. PDB Support Software] and is chaired by the HST Operations Data Manager/Code 441. The CCB shall meet at the

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direction of the chairperson.

This board is responsible for the disposition of all System Support Software CCRs and Discrepancy Reports (DRs) submitted to the HST Project CMO. The board will submit CCRs for approval of any changes to HST Level II or IIIA controlled documents as a result of a CCR disposition.

The Level IIIA-2 CCB chairperson also approves all PDB CCRs submitted to the CHAMP contractor who has responsibility for CM of the PDB.

3. CONFIGURATION IDENTIFICATION

3.1 REQUIREMENTS

Configuration Identification consists of documenting technical performance, qualification, fabrication, and acceptance requirements. The documented requirements constitute configuration baselines when they are approved by the HST Project. Configuration Identification also applies to the assignment of unique documentation identifiers and nomenclature. Documentation includes all specifications, test procedures, drawings, CI certification logs, and data lists which define or support the CI and all approved changes thereto. Configuration Identification includes physical part numbering and serialization of parts, subassemblies, and assemblies as specified in the drawings and specifications.

A CI is an aggregation of hardware and/or software, or any of its discrete portions which satisfies an end-use function. A CI should be regarded as a deliverable entity to which certain system functions have been allocated. Guidance to be used for the selection of CIs can be found in MIL-STD-973.

A Computer Software Configuration Item (CSCI) is similarly defined for software.

3.2 CONFIGURATION ITEMS

CIs are top-level flight and ground hardware and software items defined as end items in a MOU or contract. The HST Project manages the development and/or maintenance of these items. The developing organization or contractor maintains the detailed configuration of the item.

3.2.1 GSFC Development Project Configuration Items

The GSFC HST Development Project is responsible for the development of the following configuration items:

- Advanced Camera for Surveys (ACS)
- Cosmic Origins Spectrograph (COS)

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- Wide Field Camera 3 (WFC3)
- Vehicle Electrical Systems Test (VEST) Facility (refer to VEST MOU 441/442 for specific responsibilities)
- All associated test support equipment
- Solar Array (SA) 3
- Flight Support System (FSS)
- Orbital Replacement Unit Carrier (ORUC)
- Second Axial Carrier (SAC)
- Rigid Array Carrier (RAC)
- Multiuse Lightweight Equipment Carrier (MULE)
- Crew Aids and Tools
- Orbital Replacement Unit Protective Enclosures (OPEs)
- Science Instrument Protective Enclosures (SIPEs)
- Orbital Replacement Instrument (ORI) latches, rails, and associated hardware
- Ground Software for each ORI
- Flight Software for each ORI
- Science Instrument Test System (SITS)
- HST ORUs

3.2.2 GSFC Operations Project Configuration Items

The GSFC HST Operations Project is responsible for the maintenance and development of the following configuration items:

- Vision 2000 Control Center System (CCS) [includes Project Reference Data (PRD) and PRD related software]
- Science Data Capture Facility (DCF)
- Project Data Base (PDB) and PDB related software
- SSM Computer flight software
- NASA Standard Spacecraft Computer-1 (NSSC-1) flight software (including ORI development for NSSC-1)
- Science Institute hardware and software
- Vehicle Electrical Systems Test (VEST) Facility (refer to VEST MOU 441/442 for specific responsibilities)
- Monitor and Science Instrument Simulator (MASIS)
- Extended Software Test and Integration Facility (ESTIF)
- DF-224 Analysis and Software Development Facility (DASDF)

Note that the Operations Project assumes responsibility for flight and ground software for ORIs within 12 months after a servicing mission.

3.2.3 Compliance With As-built Configuration

The HST CMO and Data Manager are responsible for identifying the as-built configuration of the HST spacecraft as it is currently on-orbit. The CMO has obtained from the original HST manufacturers version and revision numbers for all documentation and drawings that define the as-built configuration of the HST spacecraft. This information has been checked against the contents of the HST Technical Information and Management System (TMIS) to ensure that it is consistent. All requests for spacecraft drawings and documentation from builders of ORIs or ORUs will be directed to TMIS to ensure compliance of new or replacement systems with the as-built configuration.

3.3 CONFIGURATION BASELINES

Configuration baselines are established at three defined milestones during the execution phase of a project. The functional baseline is identified at the start of the execution phase, allocated baseline at PDR, and product baseline at product acceptance. CM procedures will begin during Phase B. The RFP deliverables will be the basis for the start of CM baselining.

3.3.1 Functional Baseline

The functional baseline for a configuration item is identified in a contract end item specification. This specification establishes the requirements for the system, identifies the subsystems and includes the subsystem interface requirements, or references an IRD that contains the interface requirements.

3.3.2 Allocated Baseline

The allocated baseline for CIs is defined by development specifications that establish the function, performance, design, test, manufacture, and acceptance requirements for each CI. Configuration control of these specifications begins at the PDR and may be controlled by the project (if the CI is developed in-house) or the contractor (if the CI is developed outside of GSFC). At this time preliminary Interface Control Documents (ICDs) and Software Requirements Documents (SRDs) are delivered to be baselined at the Critical Design Review (CDR). The ICDs define the agreed-upon design at the interface between two or more interfacing CIs, and the SRDs define the software requirements for each CI.

3.3.3 Product Baseline

The product baseline for the CIs is defined by the configuration documentation supporting the approved design. The product base-line documentation is delivered at the CDR and approved at product acceptance after the completion of integration and testing. Included in this package will be product specifications, purchase specifications, test specifications, software design documents, computer program listings that include annotated source, object codes, drawings, and operation and maintenance manuals.

3.4 DOCUMENTATION

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This section describes the types of documentation that may be controlled by the HST Project CCB. These types are specifications and requirements documents, interface control documents, drawings, test plans and procedures, user manuals, memorandums of understanding, statements of work, and data requirements documents.

3.4.1 Specifications

Specifications consist of development and product specifications, software requirements, and design specifications.

- CI Development Specifications (MIL-STD-961D) or Contract End Item (CEI) Specifications describe the performance, design and construction, and interface requirements to be used for the design of CIs.
- CI Product Specifications (MIL-STD-961D) establish and describe in detail the performance, functional, interface, and design requirements necessary for developing the CI. The CI product specification is based on the requirements defined in the corresponding development specification.
- SRDs describe the functional, performance, and interface requirements of the software to be developed for each CI. The SRDs define and describe all Part I specification functions that have been allocated to the software.
- Software Design Documents (SDDs) describe the design of the software that meets the requirements of the SRD. SDDs will generally be declared by GSFC as configuration-controlled items after software acceptance testing. Until then, SDDs will be controlled by the developer.

3.4.2 Interface Control Documentation

Interface Requirements Documents (IRDs) and ICDs are used to control the intra-system and intra-element interfaces contained within the systems and elements. The HST Project will control the interfaces between CSCIs and between CSCIs and hardware CIs through the IRDs and ICDs. ICDs are normally generated by one of the design activities involved in the program. The following describes IRDs and ICDs:

(a) Interface Requirements Documents

IRDs delineate all physical, functional, and procedural requirements necessary for the interfaces to ensure hardware and software compatibility.

Interfaces detailed during the definition phase of the program are defined in IRDs. The IRDs are treated as system criteria and are imposed contractually at the beginning of the development phase.

(b) Interface Control Documents

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ICDs define and describe all electrical, mechanical, thermal, functional, etc., interfaces between CIs, subsystems, and systems as applicable.

ICDs are used to record design agreements between participating contractors or organizations. Each contractor or organization whose design will be controlled by the ICD is a "participating organization." The Project CCB shall evaluate and control all mutually interdependent and/or inter-acting design parameters at interfaces between participants' equipment and/or computer programs or facilities.

Interface control procedures are described in Section 8 of the HST CM Detailed Procedures Document.

3.4.3 Drawings

Engineering drawings shall be prepared in accordance with the requirements of 500-PG-8700.2.5 (GSFC X-673-64-1F), "Engineering Drawing Standards Manual", and DOD-D-1000B, "Drawings, Engineering and Associated Lists". MIL-STD-100G, "Engineering Drawing Practices" further defines engineering drawing requirements. The developing organization shall prepare engineering drawings for fabricated items, modified off-the shelf and engineering-off-the shelf equipment. The contractor's numbering system may be used unless otherwise directed by the HST Project. The GSFC drawing number assignment system will be used for in-house development in accordance with 500-PG-8700.2.3 "Issue and Management of GSFC Engineering Drawing Numbers".

3.4.4 Test Plans and Procedures

Test plans and procedures shall be prepared for all formal tests conducted by GSFC or contractors. The test plans will describe what is to be tested, the testing equipment or facilities, and the approach to the testing. Test procedures shall describe the step-by-step operations and the expected results.

3.4.5 User Manuals

User manuals delineate the functional and procedural descriptions necessary for the human-machine interface in the operations of the accepted developed system.

Operations and maintenance manuals delineate the physical and procedural means necessary for the usability, operations, and overall maintenance of the developed system.

3.4.6 Other HST Project Documentation

Other documentation used to define project requirements include MOUs, Statements of Work (SOWs), Data Requirements Documents (DRDs), Specifications for Government-Furnished

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Equipment (GFE) or Government-Specified Purchases (GSPs), and HST Project-prepared lower-level specifications.

3.4.7 Other Contract Documentation

All other documentation prepared by contractors as a result of contractually imposed documentation requirements shall meet the requirements of the contract. Documentation in this category shall normally be submitted for either HST Project or technical officer approval, review and comment, or for information only. This documentation is generally listed in the Data Requirements Document (DRD) for individual contracts.

3.5 DOCUMENT IDENTIFICATION NUMBERS

All HST Project documents generated by GSFC will be assigned identification numbers by the CMO. Numbers are assigned for both baseline documents and non-baseline documents and are valid for the life of the document.

3.5.1 Baseline Document Identification

The HST Level II CM Office assigns identification numbers to each CI, IRD, ICD, and CEI specification for the HST Project. All project specifications are assigned an "STE" number beginning with STE-01 and numbered consecutively. All IRDs and other requirements documents are assigned an "STR" number beginning with STR-01 and numbered consecutively. All ICDs are assigned an "ST-ICD" number beginning with ST-ICD-01 and numbered consecutively.

The HST Project Configuration Manager is responsible for assignment and registration of all baseline document numbers according to the following identification scheme:

SAV-XXXX	Assembly and Verification Documents
SCM-XXXX	Configuration Management Documents
SDM-XXXX	Data Management Documents
SMO-XXXX	Mission Operations Documents
SMR-XXXX	Maintenance and Refurbishment and Servicing Mission Documents
STE-XXX	Specifications
ST-ICD-XXX	Interface Control Documents
STP-XXXX	Procedures/Plans Documents
STR-XXX	Requirements Documents
SVO-XXXX	Orbital Verification Documents

The HST CMO maintains the Controlled Documents List which is defined further in SCM-1023 HST CM Detailed Procedures, Section 10.7. This list denotes document number assignments, title, CCB level (controlling organization) and informal control level, revision, date, sponsor, participating organizations, and maintenance organization. The Level II CCB chairperson

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approves additions of CCB-controlled documents to this list.

Each page of baseline documents shall contain the identification number, revision letter, and date at the top of the page opposite the binding edge and be produced in accordance with the HST Documentation Style Guide (P-440-011).

Note that there are baseline documents with numbers not in accordance with this scheme which were assigned prior to the institution of the identification scheme and the requirement to register document numbers with the CMO. These documents will be assigned document numbers in accordance with the identification scheme upon the release of a new revision.

3.5.2 Non-Baseline Document Identification

The HST Project CMO also assigns document identification numbers to documents subject to informal (non-baseline) control. These number assignments will be assigned according to the following scheme: P-440-XXX beginning with 001 and numbered consecutively, P-441-XXX beginning with 001 numbered consecutively, and P-442-XXX beginning with 001 and numbered consecutively. Note that there are informal documents with numbers not in accordance with this scheme which were assigned prior to the institution of the identification scheme and the requirement to register document numbers with the CMO.

Contractor-prepared documentation is assigned data requirement numbers in the DRD written for each contract or MOU. If a data requirement document is baselined, it will receive a baseline document number as stated in Section 3.5.1.

3.5.3 Contractor Document Identification

Contractors and other organizations responsible for producing HST documentation may use their company or organization specific numbering schemes in addition to the HST designated numbers, but the HST numbers shall take precedence. If no HST document numbers have been assigned, then the contractor or organization numbering can be used. Any contractor or organization unique identification schemes shall be included in the contractor's CM Plan.

3.6 DOCUMENT RELEASE

All CM-controlled documentation defining a baseline must be formally released no later than the establishment of that baseline. Documentation used to purchase or fabricate Ground Support Equipment (GSE), prototype or flight hardware or software prior to Critical Design Review, must be formally released. A document formally released is subject to formal change control procedure, either by the Level IV organization or by the HST Project.

The CMO will release CCB controlled documentation through the HST Project Library. The CMO will provide the library with the initial distribution list and document coordinator's name. The library will maintain the distribution list, reproduce the document, change package, or

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cancellation notice, incorporate changes into the configured version, update the library catalog, and distribute the items. The library will also enter the item into the Technical Management Information System (TMIS). The TMIS contains all project documentation and identifies current and superseded versions of documents.

A document that has been cancelled by the CCB will be so noted on the document's Configuration Chart and Document Change Record. The Configuration Chart and Document Change Record will be distributed to all holders of the document. The TMIS version field will be marked "cancelled".

Documents and drawings under Level IV CCB control are delivered to the library per the DRD requirements. The library will ensure that the data items are reviewed per the DRD requirements.

3.7 DOCUMENT STORAGE

CCB controlled documents or drawings maintained by the HST Project, including electronic media, hard copy originals or master copy, will be stored in a safe and secure document controlled area. Master originals will be released to authorized personnel only for incorporation of approved changes. Electronic storage will be write protected with limited access.

A backup system and procedures shall be implemented as disaster backup. This applies to electronic format, hard copy originals, and master copies.

3.8 PRODUCT IDENTIFICATION

GSFC functional organizations and contractors are required to mark, where feasible, all parts, subassemblies, and assemblies with a manufacturer's code identification number [FSCM or Commercial and Government Entity (CAGE) number] and manufacturer's part number in accordance with the requirements of MIL-STD-130 or equivalent. Parts numbers usually include the drawing number on which the item is described. When more than one item is described on a drawing, unique identification shall be provided by the addition of a suffixed dash number. Functional assemblies, including printed-circuit assemblies, will be serialized. Serialization to lower levels may be required for individual projects. Serial numbers are unique and non-duplicating within a group. The numbers are assigned in numeric order and are permanent for the life of the unit. All production and inspection records will use the assigned part numbers and serial numbers to ensure the traceability of parts.

4. CONFIGURATION CONTROL

4.1 CHANGE CONTROL SYSTEM

The basis for CM is an effective change control system that is achieved by accurate assessment

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of each change to the total system. This assessment is achieved through precise descriptions and thorough evaluation of proposed changes at each CCB level. The HST Project organization employs five CCB levels as shown in Figure 2-2 and 2-3.

The purpose of each CCB level is to review and determine all project impacts of approving or disapproving each change to an approved baseline. Each CCB level has the authority to disposition and implement changes that are determined to be Class II at that level (i.e., it does not affect a higher level requirement). Changes affecting higher level requirements (Class I) will be approved and submitted to the next higher CCB level for disposition. Class I and Class II changes are defined in Section 4.2 and are further delineated in MIL-STD-973.

Detailed procedures for CCR submission and processing are contained in SCM-1023 HST CM Detailed Procedures.

4.2 CLASSIFICATION OF CHANGES

4.2.1 Class I Changes

A change shall be classified Class I when one or more of the items listed below is affected:

- Documentation baselined by a higher level CCB
- Technical requirements contained in the product CI (form, fit, or function) or interface control document
- Contract end items, cost, schedule

Class I changes must be submitted for approval to the next higher Level CCB and will be limited to those which are necessary or offer significant benefit to the government.

4.2.2 Class II Changes

A change shall be classified Class II when it does not fall within the definition of a Class I change as noted in Section 4.2.1. Examples of Class II changes are:

- A change in documentation controlled at the level of the initial CCB
- A minor change in hardware (for example, substitution with an approved alternative material) which does not affect any item listed under Class I changes.
- Drawing changes that do not affect a baseline, interface, etc.

Class II changes do not require project CCB approval.

4.3 CCB INTERFACES

The following describes the interfaces between the Level II, IIIA, IIIB, IV, and V CCBs.

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4.3.1 Level II CCB

The HST Project Level II CCB is located at GSFC/Code 440. All CCRs affecting the following must be submitted to the HST Project Level II CCB:

- Level I or Level II milestones
- Requirements imposed on the JSC or the KSC
- Changes affecting other NASA centers
- Funding not included in a current approved Project Operating Plan
- Contract SOW, DRD, WBS changes designated as Level II
- Level II controlled interfaces, requirements, and specifications
- Baselining of Level II documents and changes to these documents
- HST mission operations and flight software require-meanest, spacecraft constraints and restrictions, HST command and instrumentation requirements, and servicing mission requirements.

Subordinate boards to the Level II CCB may be appointed by the chairperson. One subordinate board has been appointed as Level II-1. This board is detailed in Section 4.3.1.1.

4.3.1.1 Level II-1 CCB. The HST Project Level II-1 Space Telescope Resource Analysis Program (STRAP) CCB is located at GSFC/Code 440. All CCRs affecting the STRAP system (including both enhancements and discrepancies) and associated STRAP documentation must be submitted to this CCB. The HST Business Lead serves as chairperson. The procedures for review and disposition of STRAP CCRs are presented in the HST CM Detailed Procedures Document.

4.3.2 Level IIIA CCB

The HST Operations Project Level IIIA CCB, is located at GSFC/ Code 441. It has final authority to approve all Class I changes that do not require Level II CCB approval (Paragraph 4.3.1) and changes to documentation baselined by this board. Subordinate boards to the Level IIIA CCB may be appointed by the chairperson.

One subordinate board has been appointed and designated as Level IIIA-2 (System Support Software). This board is detailed in Section 4.3.2.1. Note that a Level IIIA-1 CCB (NSSC-1 Flight Software), Level IIIA-3 CCB (HST Information Systems) and Level III A-4 (Software Liaison Software Utility Group) were appointed and later dissolved. Additional boards, if appointed, will be designated as Level IIIA-5, etc.

4.3.2.1 Level IIIA-2 CCB. The HST Operations Project Level IIIA-2 System Support Software CCB reviews all CCRs and DRs submitted to the board by the MOSES, HSTOMS, or Sci contractors, assigns a disposition and makes recommendations to the Level IIIA CCB concerning Project Database releases. The HST Operations Data Manager serves as chairperson of this CCB. The procedures for review and disposition of PDB CCRs are presented in the HST CM

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Detailed Procedures Document.

4.3.3 Level IIIB CCB

The HST Development Project Level IIIB CCB is located at GSFC/ Code 442. It has final authority to approve all Class I changes that do not require Level II CCB approval (Paragraph 4.3.1) and changes to documentation baselined by this board. Subordinate boards to the Level IIIB CCB may be appointed by the chairperson. One subordinate board has been appointed as Level IIIB-1. This board is detailed in Section 4.3.3.1. Additional boards, if appointed, will be designated as Level IIIB-2, etc.

4.3.3.1 Level IIIB-1 CCB. The HST Development Project Level IIIB-1 Space Telescope Extra Vehicular Activity (EVA) CCB is located at GSFC/Code 442. All CCRs affecting EVA equipment (GSFC-built crew aids and tools) and EVA interfaces on space support equipment, orbital replacement instruments, orbital replacement units, and the HST must be submitted to this CCB.

The board will also review EVA procedures and contingency products and interface with the JSC EVA Support Equipment Review Panel (ESERP). The EVA and Crew Systems Development Manager serves as chairperson. The procedures for review and disposition of EVA CCRs are presented in the HST CM Detailed Procedures Document.

4.3.4 Level IV CCB

Level IV CCBs are established by each organization that has an agreement (i.e., contract, MOU, etc.) with the HST Project to supply hardware, software, and/or systems. Each organization is required to implement a CM system and to submit a CM plan/procedure for approval. The CM Plan/Procedure requirement is usually denoted as a data requirement in the DRD.

Each Level IV CCB is authorized to approve and implement Class II changes only (refer to Section 4.2 for a description of Class I and Class II changes). Class II changes are those that do not meet Class I change criteria subsequently noted. Changes approved as Class II shall be submitted to the on-site local government representative for concurrence with the classification of the change. These changes shall be submitted for review before their release at the contractor's facility.

Changes determined to be Class I and approved by the Level IV CCB shall be submitted to the HST Project CMO/Code 440. The CMO will determine the appropriate board level approvals required and distribute the change accordingly.

4.3.5 Level V CCB

Each Level V CCB is authorized to approve Class II changes only as described in Section 4.2.2.

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Class I changes will be submitted to the appropriate Level IV CCB for a disposition and forwarded to the next level if approved at Level IV.

4.4 CHANGE DOCUMENTATION

Class I changes are initiated by a HST Project CCR. Approved Class I changes may be implemented via Engineering Orders or Change Notices, depending on the type of documentation affected (i.e. document, specification, or drawings). Changes to controlled documents are designated using a Preliminary Specification Change Notice/Preliminary Interface Revision Notice form attached to a CCR. The detailed procedures for control of documentation changes are described in the HST CM Detailed Procedures Document.

4.4.1 Level II/III Change Documentation

All changes submitted to the Level II/III CCBs for review or approval regardless of originator, shall be typed and presented on a CCR form. A CCR continuation form is used as necessary. The CMO also prepares a corresponding CCR form for all changes received from the JSC Level II Mission Integration Control Board (MICB). JSC Level II changes are processed in accordance with this document and NSTS 18468 MICB Configuration Management Procedures. The CMO will ensure that the proper preliminary change notices have been prepared and numbered. The CCR serves as a CCB directive when dispositioned, signed, and documented in the appropriate CCB minutes. The procedures for submitting and processing CCRs are contained in the HST CM Detailed Procedures Document.

4.4.2 Level IV and V Change Documentation

Level IV and V Class I changes shall use the format of the HST Project CCR form, a Department of Defense (DD) 1692, Engineering Change Proposal (ECP), ECR, or any other form approved by the CMO that may be in use at the contractor facility. The designated form and explanation of its use will be noted in the Level IV CM Plan/Procedures. Class I changes submitted to the Level II/III HST Project for approval must identify all impacts, including any impacts on Level II/III controlled documentation to the extent possible. Proposed document changes shall be included with each requested change, if applicable. In the case where a Level IV organization is proposing changes to another Level IV CI, the CCR will identify the impacts to the extent possible including known documentation affected. Level IV Class I changes will be submitted to the HST Project CMO accompanied by a standard transmittal letter.

4.5 PRELIMINARY DOCUMENT CHANGE NOTICES

Proposed changes to all Level II and III controlled documents are documented on the Preliminary Specification Change Notice/ Preliminary Interface Revision Notice (PSCN/PIRN) form. The purpose of the PSCN/PIRN form is to designate the preliminary change number assigned by the document custodian, the document number, the current revision, contract affected if applicable, initiation date, number of pages contained in the PSCN/PIRN, associated contractor and project

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numbers associated with the change, CI effectivity, preparing organization signature, and specify exactly what changes are proposed to the document. A space is also included to record HST Level II/III disposition. Procedures for completing the PSCN/PIRN form and a PSCN/PIRN Continuation Form can be found in the HST CM Detailed Procedures Document.

4.6 ENGINEERING ORDERS

Changes to released drawings will be implemented via Engineering Order (EO) authority and direction. Eons will be periodically incorporated onto the field of the drawing. The CMO will be responsible for checking, copying, and stapling all unincorporated EOs to prints for distribution. The CMO will also be responsible for annotating drawings to note that stored EOs have been incorporated.

4.7 WAIVERS AND DEVIATIONS

Waivers and deviations are classified as either critical, major, or minor, and defined in accordance with the guidelines of MIL-STD-973. Minor waivers and deviations will be approved by the local on-site Government representative or technical officer. Critical and major waivers and deviations are to be documented on DD Form 1694, or equivalent, made an attachment to a CCR (Section 4.4.1), and submitted for approval in accordance with Paragraph 4.4.

4.8 CHANGE VERIFICATION

4.8.1 Hardware Verification

The HST Project shall formally verify the incorporation of approved engineering changes. Verification consists of:

- Ensuring that approved engineering changes are incorporated into engineering, manufacturing, and/or source inspection requirements
- Ensuring that engineering changes are incorporated into each item in accordance with the released engineering documentation and manufacturing orders
- Ensuring that engineering changes are incorporated into all engineering release records and operation and logistics documentation affected, and that required retrofit action is properly completed
- Ensuring that engineering changes are incorporated in supplier purchase orders, and the List of Materials
- Ensuring that certification documents have been provided for hardware when used on spaceflight items and in critical ground support applications
- Notifying the CMO that changes have been fully implemented

4.8.2 Software Verification

The HST Project shall ensure that all approved software changes are implemented. Verification consists of ensuring that:

- All software code changes have been analyzed for completeness
- Only approved changes are incorporated into the software code
- Approved changes are properly incorporated into the software code
- All documentation changes have been properly incorporated
- Any affected software modules will be loaded, compiled, and linked to ensure no complications are present
- Regression testing has been performed
- Revised software code has been released
- Software used for formal testing is generated from controlled masters

4.9 CONTRACTOR NOTIFICATION OF CHANGE ACTION

The HST Project CCB Minutes provide Level IV notification of CCB action for all Level IV-submitted changes or other changes that affect a Level IV organization. Authorization for implementation is also provided in the CCB minutes for in-scope (no cost) changes. Authorization for implementation of out-of-scope changes will be the contract modification issued by the Procurement Office. The CCB Minutes will then denote that a contract modification will be issued. The CCB Minutes shall also convey pertinent comments and actions to be taken into consideration by the Level IV organization implementing the change.

5. CONFIGURATION STATUS ACCOUNTING

5.1 REQUIREMENTS

Configuration status accounting is the recording and reporting of all HST Flight Project approved documentation and drawings that identifies established baselines and the proposed and approved changes to these baselines. The CMO will record, maintain, and report the information needed for managing the configuration effectively, including a list of the approved configuration identification, the status of proposed changes to the configuration, and the implementation of the approved changes. The configuration status accounting system generates reports that provide the various HST Project management levels with essential data on configuration identification and control. Comparison of these data with the fabricated and tested CIs will enable the HST Project to verify that each CI meets all program and contractual requirements.

5.2 STATUS ACCOUNTING REPORTS

The CMO generates and maintains the following status accounting reports:

- CCB Agenda
- CCB Minutes

- CCR Status Report
- CCR Review Report
- CCR Action Item Report
- CCR Originator Report
- Document Release Record
- Document Number Assignment Record
- Deviation/Waiver Report
- Effectivity Report
- CAL (as required)
- Status Accounting Statistics Report
- Drawings Status Report
- Indentured Parts List (as required)

See Section 8 of the HST CM Detailed Procedures Document for an explanation and examples of the status accounting reports.

5.3 CONFIGURED ARTICLES LIST

The CMO will ensure that contractors prepare and maintain Configured Articles Lists (CALs) that describes all CI hardware, software, and supporting documentation by which the exact configuration definition of the hardware and software can be determined (as-built configuration). CALs are typically delivered to the Project prior to integration and testing of the hardware unit. Formal delivery of the audited CAL will be with the acceptance data package at hardware delivery prior to DD-250 acceptance. The contents of the CALs will be defined in the DRD.

6. PROJECT CM AUDITS

The CMO will periodically perform CM audits at the project and contractor (and subcontractor, if necessary) level. Furthermore, the CM Office will continuously monitor all project disciplines involved in the CM function.

6.1 CONTRACTOR CM AUDIT

The CMO may perform formal audits at each HST Project Level IV facility to ensure that the Level IV CM practices are sufficient and compatible with the requirements of this procedure. Items to be covered during the audit are described in the HST CM Detailed Procedures Document.

Informal audits may be conducted at any time to address a specific CM problem that has been noted by the CMO. These informal audits may be in the form of telecons, letters, or technical information meetings as necessary to address the problem.

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6.2 COMBINED FUNCTIONAL AND PHYSICAL AUDIT

The CMO may participate in a combined functional and physical configuration audit on each CI at the completion of integration testing. The purpose of the audit is to review the as-built configuration of the CI against its technical documentation (Part II Product Specification, applicable ICDs, and contractor product drawing package) and to verify that the CI's actual performance complies with its Part I CEI or Development Specification and applicable IRDs.

A Functional Configuration Audit (FCA) verifies the actual performance of each segment, subsystem, and CI within the allocated functional and performance requirements defined in its segment specification or CI development specification. For segments and CIs, functional configuration audits are a prerequisite to acceptance of the development effort.

A Physical Configuration Audit (PCA) is a formal examination of the as-built configuration of a segment, subsystem, or CI against its technical documentation and of the configuration management records pertinent to the subsystem or CI in order to establish the product baseline. After successful completion of this audit, all subsequent changes to the product require HST Project CCB approval.

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CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
D	May 5, 2000	General revision to incorporate requirements of GPG 1410.1, GPG 1410.2, and 400-PG-1410.2.1. 440-PG-1410.2.1D replaces 440-PG-8700.2.1. Entered as Revision D to equate GDMS version with approved version of SCM-1020.